

REMARKS

The present Amendment amends claims 1-6-11, 13 and 14 and leaves claim 12 unchanged. Therefore, the present application has pending claims 1-14.

Applicants' Attorney, the undersigned, respectfully requests the Examiner to contact Applicants' Attorney by telephone prior to examination to discuss the outstanding issues of the present application.

Claims 1-14 stand rejected under 35 USC §102(b) as being anticipated by Takamoto (U.S. Patent No. 5,640,596). This rejection is traversed for the following reasons. Applicants submit that the features of the present invention as now more clearly recited in claims 1-14 are not taught or suggested by Takamoto whether taken individually or in combination with any of the other references of record. Therefore, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

Amendments were made to the claims to more clearly describe features of the present invention as recited in the claims. Particularly, amendments were made to the claims to more clearly recite that the present invention is directed to a storage system and a control method implemented in a storage system.

According to the present invention the storage system includes a channel controller for receiving a file access input/output (I/O) request based on file-name indication from an information processing device through a network, transmitting/receiving data to/from the information processing device and outputting a block access I/O request corresponding to the file access I/O request, a disk controller for carrying out input/output control of data stored in

a storage volume for storing the data based on the block access I/O request output by the channel controller, a first memory including a cache memory for temporarily storing the data delivered between the channel controller and the disk controller, and a data transfer network connected to the channel controller, the disk controller and the first memory.

Further, according to the present invention the channel controller is equipped with a first processor for outputting the block access I/O request corresponding to the file access I/O request and controlling the first memory, a file access circuit which has a second processor and a second memory controlled by the second processor and serves to control the transmission/reception of the file access I/O request and the data sent from/to the information processing device, a data transfer device for controlling data transfer between the first memory and the second memory, and a third memory controlled by the first processor. The elements of the channel controller are formed on a circuit module.

Still further, according to the present invention the second processor transmits information indicating the storage position of the data in the second memory to the first processor, the first processor writes into the third memory data transfer information containing information indicating the storage position of the data in the first memory and information indicating the storage position of the data in the second memory, and the data transfer device reads out the data transfer information from the third memory and controls the data transfer between the first memory and the second memory based on the data transfer information thus read out.

The above described features of the present invention now more clearly recited in the claims are not taught or suggested by any of the references of record whether taken individually or in combination with each other. Particularly, the above described features of the present invention now more clearly recited in the claims are not taught or suggested by Takamoto whether taken individually or in combination with any of the other references of record.

Takamoto teaches a system which includes an input-output controller provided with channel paths for receiving input/output requests from higher-rank apparatus, and an external storage controller connected to the input-output controller through the channels. As per Takamoto the input-output controller registers input-output requests issued for the external storage devices from the higher-rank apparatus in input-output request queues and transfer one or plural ones of the channel programs registered in the input-output request queues collectively to the external storage controller, which control execution of the transferred channel programs, so that channel command words included in each transferred channel program are executed at timings which are adapted to an operation of one of the external storage devices which is to be controlled by the channel program.

In the Office Action the Examiner alleges that the channel controller as recited in the claims corresponds to the channel control processor 108, that the first memory as recited in the claims corresponds to the memory 138, that the file access circuit as recited in the claims corresponds to the control processor 137 and the memory 139, that the connecting portion as recited in the claims corresponds to the channel paths 142 and that the third memory

recited in the claims corresponds to the memory 14, as illustrated in Fig. 1 of Takamoto. Applicants do not agree.

Applicants submit that the elements taught by Takamoto alleged by the Examiner as corresponding to the various features recited in the claims do not in any way correspond to the features recited in the claims both in structure or function. Particularly the elements taught by Takamoto alleged by the Examiner as corresponding to the various features recited in the claims are not connected to each other in the same manner as the alleged corresponding features recited in the claims nor do they perform similar operations as the alleged corresponding features recited in the claims.

For example, the alleged channel controller as taught by Takamoto does not perform the conversion of a file access I/O request to a block access I/O request as recited in the claims. Each of the claims specifically recites that the channel controller receives a file access input/output (I/O) request based on file-name indication from an information processing device through a network, and outputs a block access I/O request corresponding to the file access I/O request and that the a disk controller carries out input/output control of data stored in a storage volume for storing the data based on the block access I/O request output by the channel controller. Such a conversion of a file access I/O request to a block access I/O request is clearly not taught or suggested by Takamoto.

Further, the alleged first memory 138 and alleged connection portion 142 of Takamoto are not connected to each other as required by the claims. In Takamoto the alleged connecting portion 142 is connected between the

control processor 137 of the channel control processor 108 and the control processor 140 of the disk controller.

Still further, the alleged file access circuit 137 and 139 of Takamoto do not perform the receiving of a file access request and the outputting/conversion of a block access request corresponding to the file access request to the disk controller as required by the claims.

Even further, the alleged third memory 141 of Takamoto is contained in the disk controller 131 of Takamoto not the channel controller as required by the claims.

Thus, Takamoto fails to teach or suggest a channel controller for receiving a file access input/output (I/O) request based on file-name indication from an information processing device through a network, transmitting/receiving data to/from the information processing device and outputting a block access I/O request corresponding to the file access I/O request, a disk controller for carrying out input/output control of data stored in a storage volume for storing the data based on the block access I/O request output by the channel controller as recited in the claims.

Further, Takamoto fails to teach or suggest a first memory including a cache memory for temporarily storing the data delivered between the channel controller and the disk controller, and a data transfer network connected to the channel controller, the disk controller and the first memory as recited in the claims.

Still further, Takamoto fails to teach or suggest that the channel controller is equipped with a first processor for outputting the block access I/O request corresponding to the file access I/O request and controlling the first

memory, a file access circuit which has a second processor and a second memory controlled by the second processor and serves to control the transmission/reception of the file access I/O request and the data sent from/to the information processing device, a data transfer device for controlling data transfer between the first memory and the second memory, and a third memory controlled by the first processor as recited in the claims.

Still further yet, Takamoto fails to teach or suggest that the second processor transmits information indicating the storage position of the data in the second memory to the first processor, the first processor writes into the third memory data transfer information containing information indicating the storage position of the data in the first memory and information indicating the storage position of the data in the second memory, and the data transfer device reads out the data transfer information from the third memory and controls the data transfer between the first memory and the second memory based on the data transfer information thus read out as recited in the claims.

Therefore, Takamoto fails to teach or suggest the features of the present invention as now more clearly recited in the claims. Accordingly, reconsideration and withdrawal of the 35 USC §102(b) rejection of claims 1-14 as being anticipated by Takamoto is respectfully requested.

The remaining references of record have been studied. Applicants submit that they do not supply any of the deficiencies noted above with respect to the reference utilized in the rejection of claims 1-14.

In view of the foregoing amendments and remarks, applicants submit that claims 1-14 are in condition for allowance. Accordingly, early allowance of claims 1-14 is respectfully requested.

To the extent necessary, the applicants petition for an extension of time under 37 CFR 1.136. Please charge any shortage in fees due in connection with the filing of this paper, including extension of time fees, or credit any overpayment of fees, to the deposit account of MATTINGLY, STANGER, MALUR & BRUNDIDGE, P.C., Deposit Account No. 50-1417 (TMI-128).

Respectfully submitted,

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